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PATENT ABSTRACTS OF JAPAN

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(54) LUBRICATING RESIN TREATED STEEL PANEL EXCELLENT IN PRESS MOLDABILITY AND PROCESSED PART CORROSION RESISTANCE

(57)Abstract:

PURPOSE: To provide a lubricating resin treated steel panel improved in multistage press moldability at a high speed and processed part corrosion resistance.

CONSTITUTION: A lubricating resin treated steel panel having resin films on both surfaces thereof and excellent in press moldability and processed part corrosion resistance is constituted so that chromate films are provided to both surfaces of a galvanized or zinc or aluminum alloy plated steel panel in an adhesion amount of 5--200mg/m² per a single surface as metal chromium and resin films formed from a resin compsn. are provided on both surfaces of the steel plate in an adhesion amount of 0.3-3.0g/ 2 per a single surface on a dry wt. basis. The resin compsn. is obtained by adding 10-80 pts.wt. of silica and 1-20 pts.wt. of a polyolefin wax mixture containing polyolefin wax having a large particle size and polyolefin wax having a small particle size in a wt. ratio of (5:95)-(95:5) to 100 pts.wt. of a resin having a hydroxyl group and/or a carboxyl group.

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CLAIMS

[Claim(s)]

[Claim 1] a zinc, zinc system, or aluminum system alloy-plating steel plate top -- chromium coating weight -- metal chromium conversion -- per [5] one side - 200 mg/m² the resin coat which has a chromate film to both sides and is obtained from the following resin constituent on it -- it is -- the coating weight -- per one side -- dry weight -- 0.3 - 3.0 g/m² it is -- lubricous resin-treatment steel plate excellent in the press-forming nature characterized by having a resin coat to both sides, and processing section corrosion resistance

<Resin constituent> The resin which has - hydroxyl group and/or a carboxyl group The 100 weight sections - silica 10 - 80 weight section and the diameter polyolefine wax of a large drop () [3-5 micrometers of mean particle diameters,] [size-range 1-7micro] Poliomyelitis REFI which contains m and the diameter polyolefine wax of a granule (1 micrometer of mean particle diameters below following and maximum-droplet-size 3 mum) by the ratio of 5:95-95:5 (weight ratio) NWAKKUSU mixture 1 - 20 weight section. [Claim 2] It is the lubricous resin-treatment steel plate which the melting point of the aforementioned diameter polyolefine wax of a large drop is a thing 130 degrees C or less, and was excellent in the press-forming nature according to claim 1 which is higher than the melting point of the diameter polyolefine wax of a large drop with which the melting point uses together the aforementioned diameter polyolefine wax of a granule 20 degrees C or more, and processing section corrosion resistance.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention is a surface treated steel sheet used for an automobile, household electric appliances, a building-materials product, etc., and relates to the lubricous resin-treatment steel plate excellent in the press-forming nature in the case of pressing on press-forming nature, especially a multi-stage story, and processing section corrosion resistance.

[0002]

[Description of the Prior Art] Zn or Zn system alloy-plating steel plate receives various press working of sheet metal in many cases in the manufacturing process of these products, although an automobile, household electric appliances, the building-materials product, etc. are probably used in the fields. Although the lubricating oil was usually applied to the steel plate front face when carrying out press working of sheet metal, there were the following troubles in this work.

- (1) With a lubricating oil, generating of die galling at the time of press working of sheet metal cannot be prevented.
- (2) Since a lubricating oil is applied in many cases by the spray, a lubricating oil disperses on the outskirts and a work environment becomes bad.
- (3) although after press working of sheet metal needs to degrease a lubricating oil, if it does not degrease completely -- a next chemical conversion and paint -- a bad influence -- and chemical-conversion nonuniformity and paint nonuniformity occur
- (4) It is necessary to carry out degreasing which used the solvents (chlorofluorocarbon, 1 and 1, 1-trichloroethane, etc.) in which a work environment is reduced.

[0003] Moreover, although a previous plating steel plate is used nothing-painting or painting, it passes along various processes by then, and sets them in the state of no painting over a long time in the meantime considerably. Therefore, rust was generated in the meantime, or various matter adsorbed and adhered to the plating steel plate front face, and there were problems, like the adhesion of a paint becomes bad.

[0004] Then, chromate treatment is performed as primary rustproofing until a plating steel plate is used by the consumer. however, the corrosion resistance of this chromate treatment -- monotonous -- a salt spray test -- at most -- it is about 24 - 48 hours, and it is monotonous also at the applied type chromate treatment which added the silica sol which is special chromate treatment, and is about 100 - 200 hours in a salt spray test Furthermore, the corrosion resistance of the processing section is still lower, and is about several hours in a salt spray test. Therefore, there was a problem in respect of corrosion resistance only by performing chromate treatment as primary rustproofing.

[0005] Under such a background, it is (1) as conventional technology. It has a chromate film on a zinc system plating steel plate, and they are a compound aluminium phosphate and a chromium system rust preventive pigment on it. the urethane denaturation epoxy resin layer which contains a polyolefine wax, molybdenum disulfide, and silicone as lubricant -- 1 - 10 g/m² two-layer KUROME excellent in the corrosion resistance and lubricity which are characterized by having -- a funnel -- a processing steel plate (JP,62-24505,B) -- (2) It has a chromate film on a zinc system plating steel plate. on it Silica powder, The organic composite-steel board excellent in the cation electropainting nature characterized by having the urethane-ized epoxy ester-resin layer which contains a polyethylene wax as hydrophilic polyamide resin and lubricant by 0.3-5-micrometer thickness (JP,63-35798,A), (3) It has a chromate film on the nickel content galvanized steel sheet which consist only of a gamma layer monolayer. Moreover, as a conductive pigment as Lynn-ized iron and lubricant A polyolefine system compound, The corrosion-resistant paint layered product characterized by having a coat containing the compound and the resin for paints which were chosen from the carboxylate system compound and the polyalkylene glycol system compound by 1-20-micrometer thickness (JP,62-73938,A), (4) By making the conductive matter (carbon black, GURAFITO, a metal powder, a semiconductor oxide, Lynn-ized iron) content in a resin By reducing the electric resistance of a resin coat and making lubricant (polyethylene wax, fatty-acid amide system compound, metallic-soaps, metallic sulfide, and graphite fluoride, boron nitride, grease, alkali-metal sulfat, etc.) contain Lubricity is obtained and considering-as rust proof lubricous sex-skin film format on

constituent which can be welded (JP,63-83172,A) ** is indicated.

[0006] (1) -- any of - (4) -- although -- it is related on a chromate film at the surface treated steel sheet excellent in the lubricity characterized by having the lubricous resin coat which contains compounds, such as a polyolefine wax system, system, as lubricant, and processing section corrosion resistance

[0007] Although the lubricity of the surface treated steel sheet in the above-mentioned conventional technology is effective to low-speed press forming (a part for -5mm/) In the severe process condition (about 250mm/(minute)) in real press forming, the sliding surface became an elevated temperature (70 degrees C or more) at the time of a press, a resin coat layer becomes easy to exfoliate, resin exfoliation powder adhered to metal mold or the press-forming article front face, and there was a problem of spoiling the appearance after continuous-molding nature and processing (press-forming article).

[0008] Then, previously, by JP,02-43040,A and JP,03-16726,A, these people indicated that it was effective to specify the particle size of the polyolefine wax which specifies the glass transition point of a resin layer, or is used, in order to have prevented fixing to the metal mold of the resin layer itself or to have improved the skid of a resin layer and metal mold in high-speed real press forming. However, the mold goods actually used are because of press forming of several step story being performed [in / the manufacturing process / there are many things of a complicated configuration and] in many cases. Since the amount of powdering (the amount of resin exfoliations) increased and the press crack arose as the stage of press forming progressed even if it used the surface treated steel sheet indicated to JP,02-43040,A or JP,03-16726,A, the further improvement was needed.

[0009]

[Problem(s) to be Solved by the Invention] In view of the above-mentioned fact, also under multi-stage story press forming in high speed, press-forming nature of this invention is good, and moreover does not restrict it monotonously, but it also aims the corrosion resistance of the processing section at offer of a good lubricous resin-treatment steel plate

[0010]

[Means for Solving the Problem] Zinc, a zinc system or the press-forming nature of an aluminum system alloy-plating steel plate, and corrosion resistance can be raised by making a lubricative resin system coat form in a steel plate front face after chromate treatment so that the conventional technology mentioned above may see.

[0011] Then, employing the advantage of such conventional technology efficiently, they repeat improvement research further and this invention persons result in this invention.

[0012] Namely, chromium coating weight of this invention is metal chromium conversion on zinc, a zinc system, or an aluminum system alloy-plating steel plate. Per [5] one side - 200 mg/m² It is the resin coat which has a chromate film to both sides and is obtained from the following resin constituent on it. the coating weight per one side with dry weight 0.3 - 3.0 g/m² it is -- the lubricous resin-treatment steel plate excellent in the press-forming nature characterized by having a resin coat to both sides and processing section corrosion resistance is offered

<Resin constituent> The resin which has - hydroxyl group and/or a carboxyl group The 100 weight sections - silica 10 - 80 weight section and the diameter polyolefine wax of a large drop () [3-5 micrometers of mean particle diameters,] [size-range 1-7micro] Poliomylitis REFI which contains m and the diameter polyolefine wax of a granule (1 micrometer of mean particle diameters below following and maximum-droplet-size 3 mum) by the ratio of 5:95-95:5 (weight ratio) NWAKKUSU mixture 1 - 20 weight section. [0013] Below, the lubricous resin-treatment steel plate of this invention is explained in detail.

[0014] As a material of the target lubricous resin-treatment steel plate, various zinc, such as an electrolytic zinc-coated carbon steel sheet, an electrolytic-zinc-nickel-plating steel plate, a hot-dip zinc-coated carbon steel sheet, and a 5% aluminum-zinc hot-dipping steel plate, or a zinc system plating steel plate, an aluminum system plating steel plate, etc. can be mentioned by this invention.

[0015] The chromate film formed in both sides of these plating steel plates is a coat of the chromium hydrate subject which comes to process the solution which the well-known usual chromate film is sufficient as, for example, made a chromic anhydride, a chromate, dichromic acid, etc. the base resin, and the processing liquid which comes to mix colloidal silica, a gaseous-phase silica, etc. in this solution by the well-known usual method on a plating steel plate.

[0016] At this invention, the coating weight of a chromate film is metal chromium conversion, and is per [5] one side - 200 mg/m². It carries out. Coating weight is 5 mg/m². In the following, the adhesion between a steel plate front face and a resin coat and corrosion resistance do not become enough, but, on the other hand, coating weight is 200 mg/m². It is because chromium elution nature will fall upwards and the corrosion resistance improvement effect over the rate of the increase in coating weight will give almost to a saturation state in **, if it exceeds.

[0017] The lubricous resin-treatment steel plate of this invention has the organic resin coat obtained from the following resin constituents on the aforementioned chromate film to both sides.

[0018] Namely, the resin with which this resin constituent has a hydroxyl group and/or a carboxyl group, As opposed

to this resin 100 weight section as lubricant with a silica 10 - 80 weight sections The diameter polyolefine wax of a large drop (3-5 micrometers of mean particle diameters, 1-7 micrometers of size ranges), and the diameter polyolefine wax of a granule (hereafter 1 micrometer of mean particle diameters) 3 micrometers of maximum droplet sizes The poliomyelitis REIN wax mixture 1 which contains the following by the ratio of 5:95-95:5 (weight ratio) - 20 weight sections are contained.

[0019] The base resin of this resin constituent is an epoxy resin, alkyd resin, acrylic resin, a urethane resin, and phenol ** as such a resin, although it is the resin which has a hydroxyl group and/or a carboxyl group. Fat, melamine resin, polyvinyl butyral resin, etc. are raised.

[0020] The usefulness of these resins in this invention is in the following points.

[0021] That is, it is because it reacts with the hydroxyl group on the front face of a silica and a hydroxyl group and a carboxyl group are mentioned as an active group which can form a high anti-corrosion sex-skin film, although the inorganic organic compound coat of a silica-resin is made to form in it in order to raise corrosion resistance to the lubricous resin-treatment steel plate of this invention.

[0022] A silica is blended in order to raise the corrosion resistance of this lubricous resin-treatment steel plate. Specifically, it is colloidal silica, for example, snow tex-O and snow tex. - It is good to use, an organic silicate, for example, an ethyl silicate etc., silica powder (product made from Aerosil), for example, gaseous-phase silica powder etc., N (for all to be the Nissan chemistry company make), etc. the ORGANO silica sol (the Nissan chemistry company make), for example, an ethylcellosolve silica sol etc., etc., etc., etc. Since the particle size of silica powder distributes a silica uniformly, it is desirable that it is 5-70nm.

[0023] Moreover, you may use a silane coupling agent as a reaction accelerator of a base resin and a silica. As a silane coupling agent, gamma-(2-aminoethyl) aminopropyl trimethoxysilane, gamma-glycidoxypopyltrimetoxysilane, etc. are raised.

[0024] Below, lubricant is explained. Generally, as lubricant, a wax, molybdenum disulfide, organic molybdenum, graphite, fluoride carbon, metal soap, boron nitride, the fluororesin, etc. are known, and it is used as lubricant for bearing, or adds in plastics, an oil, grease, etc., and these are used in order to raise lubricity. The place where this invention persons considered application to the resin coat of a lubricous resin-treatment steel plate about these lubricant, The diameter polyolefine wax of a large drop (3-5 micrometers of mean particle diameters, 1-7 micrometers of size ranges), and the diameter polyolefine wax of a granule (hereafter 1 micrometer of mean particle diameters) 3 micrometers of maximum droplet sizes The polyolefine wax mixture which contains the following by the ratio of 5:95-95:5 (weight ratio) carried out the knowledge of being suitable for the use to the resin coat of the lubricous resin-treatment steel plate with which press forming of a multi-stage story is performed especially.

[0025] That is, a polyolefine wax reduces friction between a steel plate and a dice by elutriating from the resin coat front face, or existing in near very much. Then, the aforementioned diameter polyolefine wax of a large drop and the aforementioned diameter polyolefine wax of a granule are used together, and resin hide thickness should just make a friction fall contribute the latter for the former to a comparatively large press-forming initial stage at a press-forming later stage with small resin hide thickness, respectively.

[0026] the diameter polyolefine wax of a large drop -- the mean particle diameter -- 3-5 micrometers it is -- a size range -- 1-7 micrometers A thing is said. a mean particle diameter -- 3 micrometers the thing of the following -- a press-forming initial stage -- as lubricant -- acting -- hard -- on the other hand -- a mean particle diameter -- 5 micrometers The powdering-proof nature of super-** and corrosion resistance are reduced. moreover, particle size -- 1 micrometer the thing of the following is rather classified into the diameter polyolefine wax of a granule -- having -- on the other hand -- particle size -- 7 micrometers The powdering-proof nature of super-** and corrosion resistance are reduced.

[0027] For the diameter polyolefine wax of a granule, the mean particle diameter is 1 micrometer. It is the following and a maximum droplet size is 3 micrometers. What is the following is said. A mean particle diameter is 1 micrometer. Super-***** and resin hide thickness reduce powdering-proof nature and corrosion resistance in the press-forming later stage which is small. moreover, particle size -- 3 micrometers super-** -- it is rather classified into the diameter polyolefine wax of a large drop

[0028] polyolefine wax mixture -- the aforementioned diameter polyolefine wax of a large drop, and the aforementioned diameter polyolefine wax of a granule -- 5:95-95:5 (weight ratio) -- it contains by the ratio of 20:80-80:20 preferably Out of this ratio, substantially, it becomes being the same as that of the diameter polyolefine wax of large drop, or diameter polyolefine wax of granule single taste, and is because there are few lubricous-ized effects according to the press-forming stage.

[0029] In the polyolefine wax mixture used by this invention, the melting point of the diameter polyolefine wax of a large drop contained in this mixture is a thing 130 degrees C or less, and, as for the diameter polyolefine wax of a granule, it is good that the melting point is higher than the melting point of the diameter polyolefine wax of a large drop used together 20 degrees C or more.

[0030] Since a sliding surface serves as an elevated temperature at the time of high-speed press forming, in order to make it function effectively as lubricant, it is desirable as a diameter polyolefine wax of a large drop that the melting point uses a thing 130 degrees C or less. Furthermore, in order to make the lubricous-ized effect act on a press-forming later stage intensively, as for the diameter polyolefine wax of a granule, it is good to use a thing with the melting point higher 20 degrees C or more than the melting point of the diameter polyolefine wax of a large drop used together. The function which was excellent in the press-forming later stage as lubricant is demonstrated by making it such.

[0031] In addition, as a polyolefine wax, the wax which consists of a polymer of olefin hydrocarbons, such as polyethylene, polypropylene, and a polybutene, may be illustrated, any may be used, and you may use combining these.

[0032] As mentioned above, although the indispensable component of the resin constituent used for resin coat formation of the lubricous resin-treatment steel plate of this invention was explained, in addition to this, common additives, such as stabilizers including said reaction accelerator and a dispersant, may be suitably added by this resin constituent in the range which does not spoil the meaning of this invention.

[0033] Next, the blending ratio of coal of the indispensable component of this resin constituent is described.

[0034] The silica for raising corrosion resistance is 10 - 80 weight ***** to the resin 100 weight section which has a hydroxyl group and/or a carboxyl group. It is because a coat degree of hardness will increase, mold galling will be produced at the time of fabrication and press-forming nature will be reduced, if the anti-corrosion disposition top effect is small and exceeds 80 weight sections under in 10 weight sections.

[0035] The addition of polyolefine wax mixture is 1 - 20 weight section to the resin 100 weight section which has a hydroxyl group and/or a carboxyl group. Under in 1 weight section, a lubricous-ized effect is not acquired, but on the other hand, when 20 weight sections are exceeded, it is because a resin film strength falls and lubricity falls.

[0036] The lubricous resin-treatment steel plate of this invention is the resin coat obtained from the resin constituent explained to the both sides here at dry weight in one side 0.3 - 3.0 g/m² It has. coating weight -- 0.3 g/m² t e following -- the irregularity on the front face of a steel plate -- burying -- it cannot cut -- therefore, press-forming nature and the corrosion resistance improvement effect -- small -- on the other hand -- 3.0 g/m² It is because a coat will be thick and powdering-proof nature will fall by the bird clapper, although there are press-forming nature and the corrosion resistance improvement effect, if it exceeds.

[0037] Next, the example is explained in detail about the manufacture method of the lubricous resin-treatment steel plate of this invention.

[0038] First, chromate treatment is performed to the plating steel plate which is a material. This chromate treatment performs applied type chromate treatment which applies the processing liquid which mixed colloidal silica etc. in the above-mentioned solution on a plating steel plate, and should just make the coat which makes a chromium hydrate a subject form [that what is necessary is just to follow the well-known usual art] in the solution which made a chromic anhydride, a chromate, dichromic acid, etc. the base resin that what is necessary is just to perform immersing chromate treatment and an electrolytic chromate treatment. In addition, usually, after processing a plating steel plate with chromate treatment liquid, a chromate film is formed in steel plate both sides through the process extracted by the flat rubber covered roll etc., and dryness processes, such as hot air drying.

[0039] Then, an organic resin coat is made to form by the following methods on the aforementioned chromate film. That is, first, specified quantity preparation of each combination component of the aforementioned resin constituent is carried out, and they are mixed and distributed, and suppose physically that it is uniform. Next, add a silane coupling agent preferably, and it is made to mix and distribute again, and considers as a uniform resin constituent physically.

[0040] By the usual method that a roll application, a spray application, a dip painting cloth, brush coating, etc. are well-known, this resin constituent is applied so that it may become predetermined thickness, and it is usually dried for 3 - 90 seconds at 50-180 degrees C.

[0041] Thus, the lubricous resin-treatment steel plate of this invention is manufactured.

[0042]

[Example] Next, this invention is explained still more concretely based on an example.

[0043] (Example) On the following conditions, the test piece of a lubricous resin-treatment steel plate was produced. About these test pieces, press-forming nature and corrosion resistance were evaluated and the result was shown in Table 1.

[0044] (Production of a test piece)

(1) Kind A. electrolytic-zinc-coated-carbon-steel-sheet board thickness of a plating steel plate 0.8mm galvanization coating weight 20 g/m²B. electrolytic-zinc-nickel-plating steel plate board thickness 0.8mm zinc-nickel-plat ng coating weight 20 g/m² nickel content 12%C.5% aluminum-zinc hot-dipping st el plat e board thickness 0.8mm plat ng coating weight 60 g/m². [0045] (2) To both sides of chromate treatment aforementioned each plating steel plate, it is CrO₃. 20 g/l, Na₃ AlF₆ After carrying out spray processing of the chromate treatment liquid of the composition which becomesl.

4g/, hot air drying was extracted and carried out by the flat rubber covered roll. The coating weight of a chromate film adjusted the spray processing time, and was taken as the value shown in Table 1.

[0046] (3) The resin system a containing the silica powder 40 weight section and the resin system b which contains the silica powder 30 weight section to the polyvinyl-butylal-resin 100 weight section were prepared to the resin coat processing carboxyl denaturation epoxy resin 100 weight section. In addition to these, each resin constituent was prepared at a rate which shows the polyolefine wax (polyethylene wax) (mixture) shown in Table 1 in Table 1. The resin constituent was applied to both sides of each plating steel plate after chromate treatment so that it might become the coating weight shown in Table 1 by the bar coating machine, and it dried for 40 seconds at 150 degrees C, and the resin coat was formed.

[0047] (The examination / evaluation method)

(1) It carried out by having continued primary drawing and secondary drawing using the cupping testing machine about the test piece of press-forming nature evaluation method non-oiling, and the crack of a resin coat and the generating state of powdering estimated on the following criteria.

Primary drawing condition blank holder force Diameter of 1t blank . diameter of 90mmphi punch 50mmphi contraction ratio 1.8 drawing speed a part for 500mm/-- secondary drawing condition blank holder force Diameter of 1t blank Diameter of 50mmphi punch 33mmphi contraction ratio 1.5 drawing speed a part for 500mm/-- error-criterion O: -- with the crack of a paint film, and no powdering -- some -- it is -- the crack of **:paint film, powdering, and ** -- many cracks of x:paint film, and powdering -- [0048] (2) The monotonous corrosion-resistance-test salt spray test (based on JIS Z-2371) was performed for 1000 hours, and the white-rust yield estimated on the following criteria.

Error-criterion O: Less-than [5% of white-rust-generating-less **:whit rust]ex: 5% or more of w it rusts. [0049] (3) The test piece of corrosion-resistance-test non-oiling after processing was extracted on condition that (1) with the cupping testing machine, and the salt spray test (based on JIS Z-2371) was performed to the processing side for 200 hours. The same criteria as (2) estimated.

[0050]

[Table 1]

表 1 (その1)

実 験 条 件										試験・評価 結 果				
No.	めっき鋼の 板種類	クロム 付着量 (mg/m ²)	樹 脂 系	*2 樹 脂 付着量 (g/m ²)	ポリオレフィンワックス混合物							耐食性		
					大粒径ポリオレフィンワックス *3			小粒径ポリオレフィンワックス *5			フックス 混合比率 大 : 小		*5 添加量 合計 (重量部)	
					平均粒径 (μm)	融 点 (℃)	添 加 量*5 (重量部)	平均粒径 (μm)	融 点 (℃)	添 加 量*5 (重量部)				
1	A	100	a	1.2	4.7	105	5	0.8	128	5	10	50:50	○	○
2	A	100	a	1.0	3.2	98	5	0.8	128	5	10	50:50	○	○
3	A	100	b	1.1	3.2	103	5	0.6	130	5	10	50:50	○	○
4	A	100	b	1.1	4.7	105	2	0.8	128	6	8	26:76	○	○
5	A	100	b	0.9	4.7	105	3	0.8	128	12	15	20:80	○	○
6	A	100	b	1.0	4.7	105	12	0.8	128	3	15	80:20	○	○
7	A	100	a	1.0	4.7	105	12	0.8	128	3	15	80:20	○	○
8	A	55	b	1.2	3.7	109	7	0.7	131	7	14	50:50	○	○
9	A	160	b	1.0	3.7	109	7	0.7	131	7	14	50:50	○	○
10	A	100	b	0.8	4.2	82	7	0.6	110	7	14	50:50	○	○
11	A	100	b	1.7	4.2	82	7	0.6	110	7	14	50:50	○	○
12	B	100	b	1.0	4.7	105	5	0.8	128	5	10	50:50	○	○
13	C	100	b	1.0	4.7	105	5	0.8	128	5	10	50:50	○	○
14	A	100	b	1.2	4.7	105	5	0.6	106	5	10	50:50	○	△
15	A	100	b	1.2	4.7	105	5	0.6	106	5	10	50:50	○	○

発 明 例

*1 金属クロム換算、片面につき

*3 粒径範囲は1〜7μm

*5 カルボキシニル基変性エポキシ樹脂あるいは

ポリビニルアセチル樹脂を100重量部とする

*2 乾燥重量、片面につき

*4 粒径範囲は3μm以下

*6 一次絞りのみ

表 1 (その2)

実 験 条 件											試験・評価結果					
No.	めっき鋼の板種類	クロム量 (mg/m^2)	樹脂系	樹脂 付着量 (g/m^2)	ポリオレフィンワックス混合物							ワックス 混合比率 大 : 小	プレス成形性	耐食性		
					大粒径ポリオレフィンワックス*3			小粒径ポリオレフィンワックス*4						添加量総計 (重量部)	平 板	加工部
					平均粒径 (μm)	融点 ($^{\circ}\text{C}$)	添加量*5 (重量部)	平均粒径 (μm)	融点 ($^{\circ}\text{C}$)	添加量*5 (重量部)						
1	A	100	a	1.1	7.2	83	5	0.8	128	5	10	○	×			
2	A	100	a	1.0	4.7	105	5	1.6	124	5	10	○	×			
3	A	100	b	0.9	4.7	105	15	0.8	128	15	30	○	×			
4	A	100	b	1.0	4.7	105	0.2	0.8	128	0.6	0.8	○	×			
5	A	100	a	1.2	4.2	82	15	—	—	0	15	○	×			
6	A	100	a	1.2	—	—	0	0.6	110	15	15	○	×			
7	A	100	a	1.2	4.2	82	0.3	0.6	110	9.7	10	○	×			
8	A	2	b	1.0	4.7	105	5	0.8	128	5	10	△	×			
9	A	100	b	3.5	4.7	105	5	0.8	128	5	10	○	×			
10	A	100	b	0.2	4.7	105	5	0.8	128	5	10	△	×			
比 較 例													×			

*1 金属クロム換算、片面につき

*3 比較例1を除き、粒径範囲は1〜7μmである。

*5 カルボキシル基変性エポキシ樹脂あるいはポリビニルアチラル樹脂を100重量部とする。

*2 乾燥重量、片面につき

*4 比較例2を除き、粒径範囲は3μm以下である。

[0052]

[Effect of the Invention] By this invention, also under multi-stage story press forming in high speed, press-forming nature is good, and moreover does not restrict monotonously, but a lubricous resin-treatment steel plate also with the good corrosion resistance of the processing section is offered. Therefore, the flexibility of press forming of a steel plate spreads and impossible complicated processing also becomes possible conventionally.

[Translation done.]